IN THE SPECIFICATION:

Page 1, lines 7-11, amend as follows:

The present invention relates to a measurement apparatus for measuring a physical quantity such as fluid flow, pressure, temperature, O^2 concentration, etc., and especially to ~~a~~ an air flow-measurement apparatus for measuring the flow rate of air taken into an internal combustion engine.

Page 3, lines 4-14, amend as follows:

On the other hand, since the emissivity of metal is greatly smaller than other material, metal is proper ~~for~~ to prevent the temperature of the sensors from increasing due to the radiation heat. However, as described above, since the thermal conductivity of metal is large, if the whole of portions such as the auxiliary air passage or housing is made of metal, the heat is conducted to the temperature sensitive resistor, the heating resistor, the intake-air temperature sensor, etc., via the outside wall of the intake-air-passage, which in turn makes it impossible to prevent the temperature increase of the sensors.

Page 6, line 12 to Page 8, line 6, amend as follows:

Fig. 1 shows a cross sectional view of the structure of a thermal type air flow sensor of the first embodiment according to the present invention. Further, Fig. 2 shows a plan view of the structure of the thermal type air flow sensor shown in Fig. 1. As shown in Fig. 1 and Fig. 2, the thermal type air flow sensor 1 includes a semiconductor sensor element 2, a substrate 8 for supporting the semiconductor sensor element 2, an auxiliary air passage 11a, metal terminals

28 for outputting signals to and inputting signals from an external circuit, etc. The air flow direction is shown by arrow 31 in Fig. 2. Further, a diaphragm composed of an electrical insulating film is formed in the back surface part of a semiconductor substrate by an anisotropic etching method, and the semiconductor sensor element 11a which includes a heating resistor 3 formed on the diaphragm, and a temperature sensitive resistor 4 formed on the semiconductor substrate, for measuring the temperature of intake-air. A control circuit 23a mounted on a ~~substrate~~ circuit board 9 controls resistor-heating current which flows in the heating resistor 3 so as to hold the temperature of the heating resistor 3 higher by a predetermined value than that of the temperature sensitive resistor 4. The intake-air flow rate signal is obtained based on the resistor-heating current. When the inside wall ~~12~~ of main air passage 12 is heated by receiving the heat generated in an engine, the heat is conducted to a housing 15, a cover 13, and the auxiliary air passage 11a from the inside wall ~~12~~ main air passage 12, and further to the semiconductor sensor element 2. Furthermore, when the inside wall ~~12~~ of main air passage 12 is heated, the above members are also heated by the heat radiation from the inside wall ~~12~~ of the main air passage 12, and the heat is further conducted to the semiconductor sensor element 2. Accordingly, the temperature of the temperature sensitive resistor 4 becomes higher than that of the intake-air, and this causes an error of a signal output from the semiconductor sensor element 2. Moreover, the quantity of heat dissipation from the heating resistor 3 changes due to the temperature increase of the semiconductor sensor element 2, and this also causes an error of the signal output from the semiconductor sensor element 2. Thus, in

the present invention, resin such as PBT (polybutylene terephthalate) resin, PPS (polyphenylene sulfide) resin, and so forth, whose thermal conductivity is small, is used for the ~~hosing~~ housing 15, the cover 13, the wall of the auxiliary air passage 11a, etc., and their surfaces are covered by films 6, 6a, and 6b, made of material of small emissivity.

Page 9, line 4 to Page 11, line 16, amend as follows:

If the films 6, 6a, and 6b covers all faces of the respective resin member, it brings a greatly large effect. However, as shown in Fig. 1 and Fig. 2, it also brings a large effect that the films 6, 6a, and 6b cover only side surfaces of the respective resin members, the side surface being in parallel with the inside wall ~~12~~ of the main air passage 12, whose areas are large, and which ~~tender~~ tend to receive the radiation heat. Further, this structure can save nickel metal, and reduce the cost of the air flow sensor. On the other hand, it was found that since the thermal expansion coefficient of nickel film is greatly different from that of PBT resin, when a heat-shock test was performed to the nickel-film coated PBT resin member, the nickel films 6, 6a, and 6b, sometimes fell off from the PBT resin members, or cracks came up in the nickel films 6, 6a, and 6b. One of countermeasures to this problem is to strengthen the adhesiveness of the nickel films 6, 6a, and 6b to the PBT resin members. Another countermeasure is to fabricate the nickel films 6, 6a, and 6b as fine mesh type films (assemblies of flakes) as shown in Fig. 3. Since the generated stress can be more relaxed in the mesh type films 6, 6a, and 6b than in the films 6, 6a, and 6b without any hole in them, the falling-off of the mesh type nickel films or the generation of the cracks

in the mesh type nickel films hardly occur, and such mesh type nickel films can keep their good look even if cracks occur in the films. Moreover, by connecting a part or all of the flakes to each other, it is possible to more sufficiently prevent such falling-off. Particularly, it is effective to connect the flakes in the portion at which the speed of air flow is large. Also, it is effective to change the composition of the resin member in a particular position so that the emissivity of this portion become smaller.

Figure. 5 shows the composition of a test facility for examining thermal effects on sensors in an engine room, and the outside wall ~~12~~ of the main air passage 12 is surrounded by a constant temperature batch 32. Further, the controlled temperature of the constant temperature bath 32 is set so as to keep the temperature of the outside wall ~~12~~ of the main air passage 12 at 80°C, and air of about 20°C is passed through the main air passage 12. Fig. 17 shows an example of results of the test in which the temperature increase of the semiconductor sensor element 2 was examined with regard to various combinations of; material used for members composing the housing 15 and the auxiliary passage 11a; and material used for the films 6; by using the test facility shown in Fig. 5. Also, Fig. 6. shows an example of results of the test in which the temperature increase of the semiconductor sensor element 2 was examined with regard to various flow rates of air.

If the housing 15 and the auxiliary air passage 11a are made of only resin, the influence of the radiation heat from the inside wall ~~12~~ of the main air passage 12 is large, and this causes a large temperature increase of 14°C. On the other hand, if the surfaces of the respective resin members is plated with

nickel of 0.01 – 0.03 mm thickness, the influence of the radiation heat is reduced, and the temperature increase is in just 4 °C. However, if the thickness of the nickel plate if larger than 0.1 mm, the temperature increase becomes larger on the contrary. This is because the effect of the thermal conductivity of the nickel plate cannot be neglected if the thickness of the nickel plate is increased. Thus, it is suggested that there is the optimal thickness of the nickel plate (film) 6.

Page 12, lines 2-8, amend as follows:

Although iron, magnesium, nickel-chrome alloy, stainless alloy, etc., also bring a similar effect, since the emissivity of the members ~~tenders~~ tends to increase if material such as the above material, on which an oxide film or a passivation film is easily formed, is used, it is occasionally necessary to provide a countermeasure to the forming of an oxide film or a passivation film.

Page 13, lines 18-23, amend as follows:

Further, another embodiment is explained ~~bellow~~ below with reference to Fig. 18 and Fig. 19. Fig. 18 shows a cross sectional view of a thermal type air flow sensor 1 of this embodiment according to the present invention. Fig. 19 shows a plan view of the thermal type air flow sensor 1 shown in Fig. 18.

Page 15, lines 22 to Page 16, line 5, amend as follows:

Furthermore, since the support portion 44 corresponds to the housing 15 shown in Fig. 18 and 19, it is natural that the structure, not shown diagrammatically, in which the resin skirts 42a and 42b are situated at the

housing 15, will bring a similar effect. Meanwhile, the housing 15 and the support portion 44 are described in claims of the present invention, assuming ~~the~~ that they indicate the same portion. Also, it is assumed that the cover 13, which is shown in Fig. 1, Fig. 18, indicates the same portion of the housing 15.

Page 15, line 21 to Page 17, line 22, amend as follows:

Fig. 8 and Fig. 9 show the structures of respective air temperature sensors 20 to which the present invention is applied. Here, resin members are used for the auxiliary air passage 11a in which the air temperature-detecting resistor 5 retained by support pins 21 is situated, and the auxiliary air passage 11a is covered by a layer made of material whose emissivity is small. By this structure, the temperature increase of the auxiliary air passage 11a can be suppressed, and the influence of the heat transferred to the air temperature-detecting resistor 5 via the auxiliary air passage 11a is further reduced, which in turn can improve the measurement accuracy of the air temperature sensor 20. Meanwhile, since the material of the layer covering the auxiliary air passage 11a is the same as that used in the above embodiments, the explaining of the material is omitted.

Further, another embodiment is explained ~~bellow~~ below with reference to Fig. 10 and Fig. 11. Fig. 10 shows the structure of an thermal type air flow sensor 1 using a plate sensor element, a thin substrate 16 using a ceramic plate or a glass plate, on one surface of which a temperature sensitive resistor 4 and a heating resistor 3 are formed, is located in the auxiliary air passage 11a. Further, Fig. 11 shows the back surface of the thin substrate 16 shown in Fig. 11. As shown in Fig. 11, metal films 7 and 7a whose emissivity is smaller than

that of ceramics or glass, are formed on the areas opposite to the temperature sensitive resistor 4 and the heating resister 3, of the back surface.

Page 19, lines 12-14, amend as follows:

Further, a pressure sensor 50 of another embodiment according to the present invention is explained ~~bellow~~ below with reference to Fig. 13.